Staying the Course:

Maintenance of Healthy Eating and

Physical Activity Among South Dakota

All Women Count! WISEWOMAN Participants

A Report to the South Dakota Department of Health

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Abstract

Background: *"All Women Count!"* is the state of South Dakota's breast and cervical cancer screening program funded by the Centers for Disease Control and Prevention. *"All Women Count!"* includes a special project called WISEWOMAN, which targets heart disease risk reduction among women. Through the WISEWOMAN project, qualifying low-income and uninsured women aged 40-64 years are screened for cardiovascular and diabetes risk factors, referred, and offered four physical activity and nutrition counseling interventions with trained health coaches.

Purpose: This project was the third phase of a process evaluation of South Dakota (SD) WISEWOMAN. The purpose of this project was to: (a) examine maintenance of healthy eating and physical activity behaviors beyond the 6 month post counseling period and, (b) to explore facilitators and barriers to maintenance of these behaviors among WISEWOMEN participants.

Design and Method: A process evaluation survey research design was used. Eligible participants were WISEWOMAN enrollees who had progressed from the precontemplation, contemplation or preparation stage of healthy eating and/or physical activity behavior to the action stage of either or both of these behaviors based on data from a previous study. Eligible participants ranged from 11 to 19 months post-baseline measurement. An invitational postcard was mailed to 415 eligible participants requesting participation in a 15 minute telephone interview about how they were doing with healthy eating and physical activity. There were 93 postcards returned as undeliverable. Of the 322 eligible participants who potentially received an invitation to participate, 158 responded (49%) and 55% of respondents (n=87) agreed to complete a 15 minute interview at a time and day most convenient to them. There were 72 interviews completed. Descriptive and nonparametric statistics were used to describe the sample and compare stage of health behavior change from baseline to follow-up. Qualitative content analysis for emerging themes was used to analyze data from the open-ended questions about facilitators and barriers to health behavior change and advice to other women.

Results: Respondents ranged in age from 44-67 years, mean age was 49.9 $\pm$ 5.33 years. Racial and ethnic composition of the participants was: 85% Caucasian, 14% American Indian and 1% other. The majority of women were employed (66.1%) and 40% were married while 38% were divorced and 18% were widowed.

Of the 72 interviews, 69 women received at least one face-to-face physical activity or dietary counseling session (range 0-4 sessions). The mean number of counseling sessions received was 3.1 ($\pm$1.26*)*.

Improvements in healthy eating behavior were maintained by 65% (n=44) of the women who reported that they were eating a heart healthy diet at the first follow-up period (n=68). Women who did not report maintenance of heart healthy eating (n=24) were in the preparation (n=18) and contemplation (n=6) stages of healthy eating. No participants were in the precontemplation stage of change (i.e., not currently thinking about changing their eating habits). Four of the 72 participants were not eating a heart healthy diet at the first follow-up period. All four of these women were in the contemplation stage at follow-up period one. In the current study, these four women were in the preparation stage of healthy eating.

Improvements in physical activity were maintained by 70% of the women (n=46) who reported that they were regularly active at the first follow-up period (n=63). Women who did not report maintenance of regular physical activity were in the preparation (n=13) contemplation (n=4) and precontemplation (n=2) stages of physical activity behavior. The two precontemplators reported that they were no longer regularly active and were not thinking about changing their current activity due to physical health problems. Five of the seven interviewees were not regularly active at the first follow-up period (i.e., contemplation stage n=5). In the current study, these five women were in the contemplation stage (n=3) and the preparation stage (n=2) and of physical activity behavior change.

Of the 57 women who reported the action stage of both healthy eating and regular activity at follow-up one, 42 (i.e., 73.6%) maintained both behaviors over the 11-19 month follow-up interval.

Seven qualitative themes emerged as facilitators of maintenance of healthy eating behavior. These themes were: educational knowledge and awareness, the All Women Count program, family support, personal health conditions, family health issues, cooking healthy foods, and feeling better. There were five themes that emerged as barriers to maintenance of healthy eating behavior. These themes were: cost of healthy foods, personal preference for less healthy foods, time, eating out, and cooking for others. Two physical environmental issues commonly influenced maintenance of healthy eating. These issues were availability of garden produce, and rural access to healthy choices.

Four qualitative themes emerged as facilitators of maintenance of regular physical activity behavior. These themes were: support from others, enjoyable activity, occupational activity, and finally, knowledge of the benefits of physical activity. There were four themes describing barriers to maintenance of regular physical activity. These themes were: personal health issues, time, weather and motivation. Two physical environmental factors facilitated or hindered maintenance of regular physical activity. These factors were: convenient access to places for activity and cost of exercise facilities.

Analysis of advice to other women about how to maintain improvements in healthy eating and physical activity resulted in five themes: move more, stick to a plan, make conscious food choice, do it to improve your live and make time.

Participants commented on the benefit they received from the AWC interventions. There were two themes that emerged from this analysis. Participants believed that they would not have to access to the screening procedures without the AWC program. There was also a belief that the counseling interventions and materials were valuable. Participants rated that value of the program as 4.1 on a scale of 1-5, with 5 representing the highest value.

Conclusions and Recommendations: More than 60% of the participants in this study maintained changes in healthy eating and or physical activity behavior from baseline to 11-19 months follow-up. Seventy-three percent of participants who achieved the action stage of both healthy eating and physical activity behavior maintained both of these healthy behaviors over 11-19 months follow-up. Supplementing the existing All Women Count! cancer screening program for low-income SD women with cardiovascular disease risk factor assessment and intervention facilitates maintenance of health behavior

change among women who achieve the action stage of healthy eating or physical activity after the WISEWOMAN interventions.

Community partnerships that promote access to healthy eating options and safe year-round physical environments for activity are needed. Rural women in particular lack access to healthy choices in grocery stores and restaurants. Since nearly two-thirds of the women in this program are working, work-site partnerships are also a potential source of partnerships for heart healthy living.

The AWC program should emphasize lasting behavior change through personal goal setting and commitment to improved cooking and enjoyable activities that fit into the day. Rural women named gardening as both an important physical activity and a source of healthy eating. Involving community resources in promoting gardening as a health behavior is an innovative way to promote women's health in this rural setting.

Acknowledgements

Support for this project was provided by the South Dakota Department of Health. The *All Women Count!* WISEWOMAN project coordinator, Patty Lihs, BS and the project director, Norma Schmidt, MA provided background information and feedback throughout the project period. The project assistant for this research was Stephanie Hecht, a prenursing student at South Dakota State University.

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Staying the Course: Maintenance of Healthy Eating and Physical Activity Among South Dakota *All Women Count!* WISEWOMAN Participants

Maintenance of health behavior change is a public health conundrum. While the quality of life and chronic disease risk reduction benefits of healthy eating and regular physical activity are well understood, our ability to promote adherence to a lifetime of these health behaviors is very limited (Institute of Medicine [IOM], 2001). Intervention strategies that lead to adoption of health behaviors are well-developed, while our knowledge of how to facilitate sustained health behavior is poorly understood. The specific aim of this study was to examine whether participation in a public health program targeting heart disease risk reduction among low-income women facilitated maintenance of health behavior beyond the initial six month follow-up period.

Background

Heart disease is the leading cause of death for women (American Heart Association [AHA], 2005). In the state of South Dakota (SD), women accounted for 52% of heart disease deaths in the year 2001 (South Dakota Department of Health [SDDOH], 2003). Heart disease in women often goes undiagnosed until it reaches an advanced stage (AHA). Early identification of women at risk for heart disease is essential, especially for low-income and minority women who are at greater risk of heart disease because they are more likely than insured women to have risk factors for cardiovascular disease (CVD) (e.g., smoking, poor diet quality and sedentary lifestyle). These women also lack access to health care services (Centers for Disease Control and Prevention [CDC], 2003). Public health programs that provide comprehensive CVD services for low-income women are essential. A promising CDC program that combines existing public health programs for low-income women with CVD risk reduction interventions is called WISEWOMAN.

WISEWOMAN

WISEWOMAN is an acronym referring to Well-Integrated Screening and Evaluation for Women Across the Nation (CDC, 2003). WISEWOMAN is an extension of the National Breast and Cervical Cancer Early Detection Programs (NBCCEDP) funded by the CDC. The SD WISEWOMAN project is implemented as part of the SD NBCCEDP called "*All Women Count*!". Participants in *All Women Count*! are also income-eligible for WISEWOMAN. Screening for qualifying women aged 40-64 years began in 2001. Screening services include blood cholesterol, blood pressure and blood sugar. Nutrition and physical activity interventions are delivered through four one-on-one counseling sessions that are based on *A New Leaf-Choices for Healthy Living* (UNC, 2001) and *Active Living Every Day* (Blair, Dunn, Marcus, Carpenter, & Jaret, 2001). The "Active Living" workbook was developed by the Cooper Aerobics Center in Dallas, TX, based upon a successfully tested cognitive-behavioral approach to improving physical activity.

We previously reported on high levels of program satisfaction among SD WISEWOMAN participants (Fahrenwald, 2004a) and among the interventionists who deliver the WISEWOMAN counseling sessions (Fahrenwald, 2004b). Women enrolled in WISEWOMAN who participated in one or more healthy eating or physical activity counseling sessions significantly improved their consumption of heart healthy foods and their weekly minutes of moderate physical activity from baseline measurement (Fahrenwald, 2004a).

The SD WISEWOMAN interventions are based upon the Transtheoretical Model of Behavior Change (Prochaska, DiClemente, and Norcross, 1992) and other social and cognitive factors. Women receive counseling messages that facilitate their ability to advance from not thinking about healthy eating or physical activity (precontemplation stage) or thinking about healthy eating or physical activity (contemplation stage) to taking small steps toward changing these health behaviors (preparation stage) and ultimately to regularly eating a heart healthy diet and participating in physical activity

most days of the week (action stage). Definitions of the stages as applied in the SD WISEWOMAN program and this study are included as Table 1.

Table 1.

Definitions of the Transtheoretical Model Stages of Healthy Eating and Physical Activity Behavior Change

Stages of Healthy Eating	Definition
Precontemplation	Participants not currently eating a heart healthy diet and not thinking about starting to eat a more healthy diet.
Contemplation	Participants not currently eating a heart healthy diet but thinking of starting to eat a more healthy diet in the next six months.
Preparation	Participants not currently eating a heart healthy diet but have plans to start in the next month.
Action	Participants currently eating a heart healthy diet for less than six months.
Maintenance	Participants currently eating a heart healthy diet and plan to stick to a healthy diet.
Stages of Physical Activity	**Definition**
Precontemplation	Participants not currently getting regular physical activity and not thinking about starting.
Contemplation	Participants not currently getting regular physical activity but thinking of starting in the next six months.
Preparation	Participants not currently getting regular physical activity but have plans to start in the next month.
Action	Participants currently getting regular physical activity for less than six months.
Maintenance	Participants currently getting regular physical activity and plan to stick to it.

Note. Adapted from Prochaska, DiClemente, & Norcross (1992).
Healthy eating behavior was defined as a heart healthy diet that includes only small amounts of fat from meat, dairy products, spreads or sauces and includes plenty of fruits, vegetables and grain products (UNC, 2001). Physical activity behavior was defined as doing activities that really get you moving for a total of 30 minutes on most days of the week. Examples of activities were given, including pushing a vacuum cleaner, sweeping, raking and walking at a brisk pace (UNC, 2001).

In our first follow-up study, women who received counseling were more likely to advance from the earlier stages of health behavior change (i.e, precontemplation, contemplation and preparation) to the action stage of behavior change than woman who did not receive counseling (Fahrenwald, 2004a). What is unknown is whether the short-term improvements in healthy eating and physical activity were maintained beyond the initial six month follow-up period. Women who maintain a heart healthy diet and regular activity for more than six months are in the maintenance stage of health behavior change. Maintenance of a heart healthy diet and daily physical activity is essential in order to achieve and maintain the chronic disease risk reduction benefit of these behaviors.

There is a need to examine whether public health interventions like the WISEWOMAN program not only facilitate the process of health behavior change among enrollees; but also, whether these programs lead to lasting behavior change. There may be both personal and environmental factors that facilitate or hinder the maintenance of health behavior change for WISEWOMAN participants. Understanding factors that influence behavioral maintenance can strengthen future interventions to improve the health of low-income women.

Purpose

The purpose of this third phase of the process evaluation of SD WISEWOMAN was to: (a) examine maintenance of healthy eating and physical activity behaviors beyond the 6 month post-counseling period and, (b) to explore facilitators of and barriers to maintenance of these behaviors among WISEWOMAN participants.

Design and Method

A process evaluation survey research design was used. Eligible participants were 415 AWC enrollees who had progressed from the precontemplation, contemplation or preparation stage of healthy eating and/or physical activity behavior to the action stage

of either or both of these behaviors based on data from a previous study (Fahrenwald, 2004a). All potential participants were 11 to 19 months post-baseline measurement. There were six evaluation research questions:

1. Did WISEWOMAN participants who reported change to either regular healthy eating and/or physical activity behavior at the initial follow-up period maintain these changes for more than six months?
2. What were the facilitators of maintenance of healthy eating and regular physical activity for SD WISEWOMAN participants?
3. What were the barriers to maintenance of healthy eating and regular physical activity for SD WISEWOMAN participants?
4. Are there perceived physical environmental issues that influence maintenance of healthy eating and physical activity for SD WISEWOMAN participants?
5. What advice would participants offer to other WISEWOMAN participants about maintaining changes in healthy eating and physical activity? And,
6. What is the perceived value of the *All Women Count*! WISEWOMAN program?

Institutional Review Board approval for evaluation research involving human subjects was obtained from South Dakota State University (SDSU). Eligible participants were mailed and informational letter that introduced that the study, invited participants to enroll in the interview and informed women of their rights as research participants (Appendix A). Informed consent to participate was implied by returning a self-addressed stamped postcard with a check marked "YES, I am willing to participate in the interview" (Appendix B). A participant identification number was included on the return postcard and both the mailed and return envelopes for tracking purposes. Interested participants indicated a telephone number, day of the week and time of day to be contacted. There were 93 postcards returned as undeliverable. Of the 322 eligible participants who potentially received an invitation to participate, 158 responded (49%)

and 57% of respondents (n=87) agreed to complete a 15 minute phone interview at a requested time and day most convenient to them. There were four attempts at reaching each of the 87 participants. Seventy-two interviews were completed.

Survey Instrument

The confidential telephone interview tool was designed for this study (Appendix C). Instrument development was derived in part from the first follow-up survey of SD WISEWOMAN participants (Fahrenwald, 2004a) and from materials developed by the North Carolina (NC) WISEWOMAN project (NC WISEWOMAN, 2000). The telephone survey included 16 questions with multiple response formats designed to answer the research questions. Nine questions examined maintenance of healthy eating and physical activity behavior change among the women enrolled in the program. In order to examine changes in stage of health behavior change, these questions were the same questions that were used at baseline and for the phase one follow-up evaluation. Six open-ended response questions solicited perceived facilitators of and barriers to maintenance of healthy eating and physical activity, including physical environmental issues. Participants were also asked to offer advice to other women in order to help them maintain healthy eating and physical activity. The perceived value of the All Women Count! program was also evaluated. The instrument was pilot-tested with a group of three low-income women who suggested no modifications to the survey format and length. Readability was established at a 5th grade level using the SMOG index (National Cancer Institute, 1989). Interviews took approximately 15 minutes of participant time.

Data Analysis

All data were analyzed using the *Statistical Package for the Social Sciences* (SPSS) *Version 13.0 for Windows*® (2004). Frequency counts and descriptive statistics were used to describe the sample and to examine whether changes in healthy eating and physical activity were maintained over time. Comparisons between baseline and the

current study were analyzed using nonparametric statistics. The Mann-Whitney *U* test (*U* statistic) was used to compare demographic characteristics of participants and other eligible women on interval level data. The Wilcoxon signed-rank (*T* statistic) test was used for within subject analysis of change from baseline to the current study. Categorical data were analyzed using the Chi-square test (χ^2) (Jaccard & Becker, 1997). There were no missing data for these analyses.

Content analysis for themes was used to analyze responses to the open-ended questions about facilitators and barriers to maintenance of healthy eating and physical activity and the item soliciting advice to other women. Written interview transcripts were examined separately by two researchers for emerging themes. Criteria for emerging themes included the number of times an issue was cited (five or more citations per theme) and coded contextual agreement of participant response data within each theme. After primary analysis by the two researchers, comparison of themes and coded notes on participant agreement occurred. Decisions about retaining and naming common themes, revising themes or removing a theme were made through reanalysis of the coded data and researcher agreement.

Results

The following subsections begin with a description of the sample. A detailed analysis of each of the research questions is provided.

Description of the Sample

Respondents ranged in age from 44-67 years, mean age was 49.9 $\pm$ 5.33 years. Racial and ethnic composition of the participants was: 85% Caucasian, 14% American Indian and 1% other. The majority of women were employed (66.1%) and 40% were married while 28% were divorced and 18% were widowed. Of the 72 interviews, 69 women received at least one face-to-face physical activity or dietary counseling session (range 0-4 sessions). The mean number of counseling sessions received was 3.1 ($\pm$1.3*)*. Demographic data at the time of enrollment were compared for respondents

(n=87) and nonrespondents (n=235) to examine whether there were differences between the groups. There were no significant differences in income, marital status, current employment, age or ethnicity for the two groups.

Maintenance of Health Behavior

Analysis of maintenance of behavior change was done for healthy eating and physical activity. The stages of change for healthy eating and physical activity behaviors were measured through self-report items. The percentage of respondents at each of the five stages of behavior change for both behaviors was also ascertained. Baseline data, follow-up survey one data, and the results of this study were contrasted to examine whether improvements in health behavior were maintained by the participants.

Healthy eating behavior

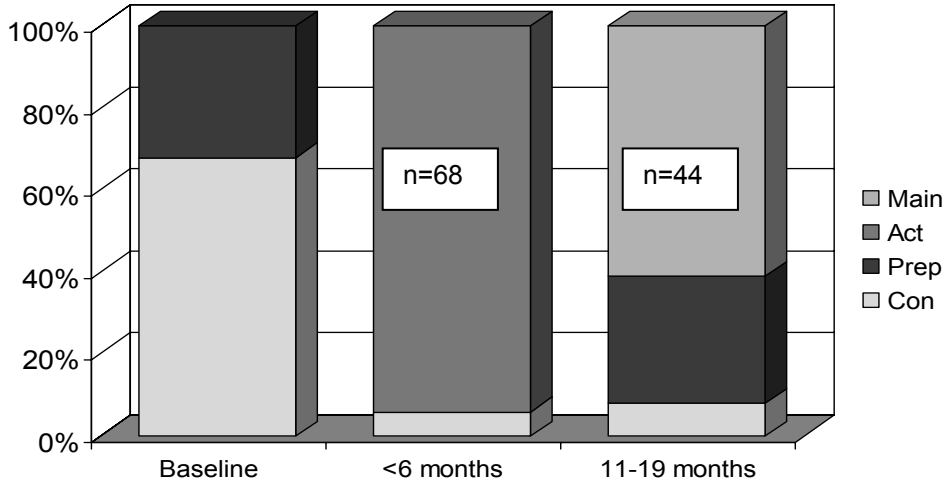
Heart healthy eating behavior was defined as a diet that includes only small amounts of fat from meat, dairy products, spreads or sauces and includes plenty of fruits, vegetables and grain products (UNC, 2001). Stage of heart healthy eating behavior was examined through self-report using survey questions one through five, which were also used at baseline and in the first follow-up study. Interview questions categorized women into five stages of healthy eating behavior as defined in Table 1. Women not currently eating a heart healthy diet were in the precontemplation, contemplation and preparation stages. Women who were consuming a healthy diet were in the action and maintenance stages. Women who reported that they had been eating a heart healthy diet for more than 6 months were coded as maintenance stage.

For this analysis, the percent of women at each of the stages of healthy eating behavior were contrasted between baseline, follow-up study one and the current study (Figure 1). Improvements in healthy eating behavior were maintained by 65% of the women (n=44) who reported that they were eating a heart healthy diet at the first follow-up period (n=68). Of the 68 women, 24 participants did not report maintenance

of heart healthy eating. These women were in the preparation (n=18) and contemplation (n=6) stages of healthy eating. No participants were in the precontemplation stage of change (i.e., not currently thinking about changing their eating habits). Four of the 72 participants were not eating a heart healthy diet at the first follow-up period. All four of these women were in the contemplation stage at follow-up period one. In the current study, these four women were in the preparation stage of healthy eating.

Figure 1.

Percent of Participants at the Stages of Heart Healthy Eating: Baseline, < 6 months and 11-19 months (n=72)



Note. CON = Contemplation, PREP = Preparation, ACT = Action, MAINT = Maintenance. There were 68 of 72 women at the action stage at <6months and 44 of 72 women at the maintenance stage at 11-19 months.

In summary, approximately two-thirds of participants maintained a healthy diet over the 11-19 month follow-up period. Participants who did maintain healthy eating were thinking about eating healthy or taking small steps to improving their diet. Of the four participants who were not eating a heart healthy diet at < 6 months, not one had progressed to the action or maintenance stage of behavior change.

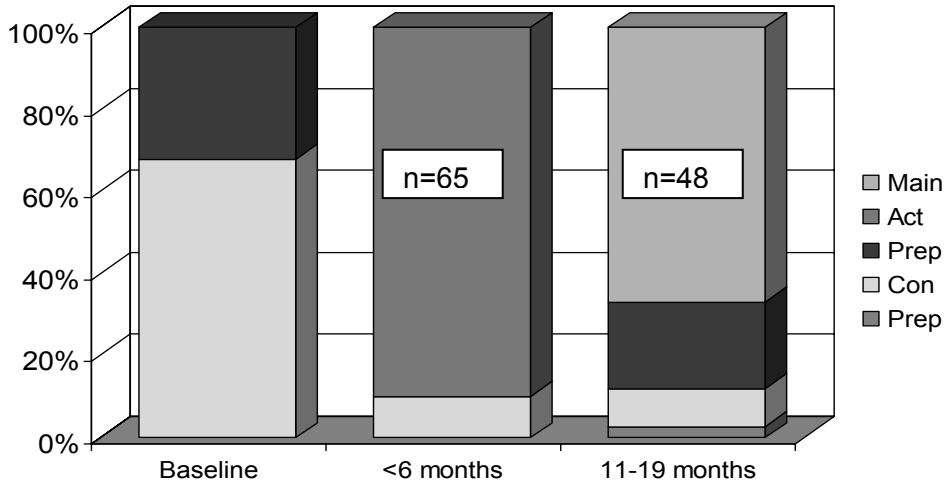
Physical activity behavior

Self-report of stage of physical activity behavior change was examined for all respondents. Regular physical activity was defined as doing activities that really get you moving for a total of 30 minutes on most days of the week (UNC, 2001). Examples of activities were given, including pushing a vacuum cleaner, sweeping, raking and walking at a brisk pace. Interview questions 6-9 were used to categorize participants into the five stages of physical activity behavior change as defined for this study (Table 1). These questions were compared to corresponding baseline and follow-up study one data in order to explore changes in stage of physical activity behavior change.

Two-thirds of participants (i.e., 67%) reported maintenance of regular physical activity in this study (Figure 2). Improvements in physical activity were maintained by 70% of the women (n=46) who reported that they were regularly active at the first follow-up period (n=65). Two women who were not regularly active at follow-up period one (i.e., contemplation stage) reported current regular activity of > 6 months duration (i.e., maintenance stage). There were 19 women who did not report maintenance of regular physical activity despite reporting regular activity at follow-up period one. These women were in the preparation (n=13), contemplation (n=4) and precontemplation (n-2) stages of physical activity behavior change. Two of the participants who were regularly active at follow-up period one reported that they were not regularly active currently and they were not thinking about changing due to physical health problems (i.e., precontemplation stage). Five of the seven participants who were not regularly active at the first follow-up period were in the contemplation stage at that time. In the current study, these five women were in the contemplation stage (n=3) and the preparation stage (n=2) and of physical activity behavior change.

Figure 2.

Percent of Participants at the Stages of Physical Activity Behavior Change: Baseline, < 6 months and 11-19 months (n=72)



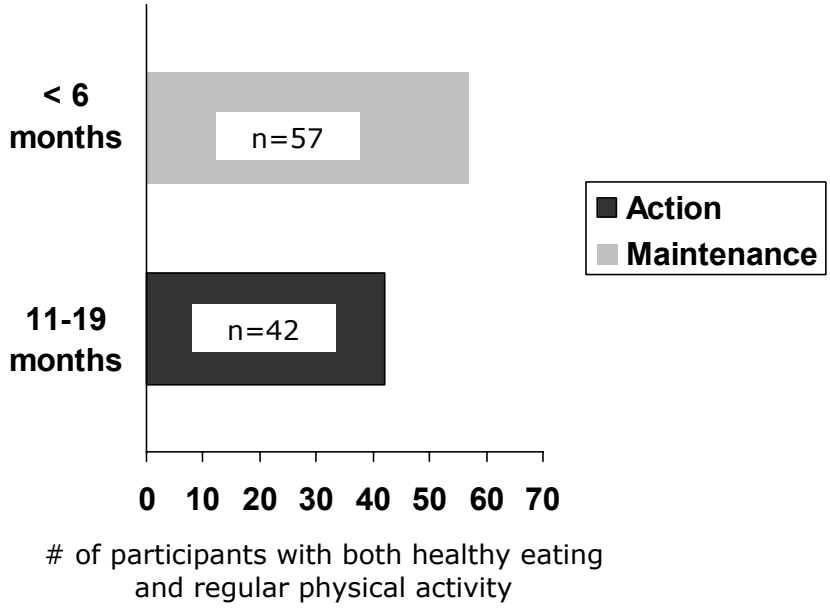
Note. CON = Contemplation, PREP = Preparation, ACT = Action, MAINT = Maintenance. There were 65 of 72 women at the action stage at <6months and 48 of 72 women at the maintenance stage at 11-19 months.

Maintenance of both heart healthy eating and physical activity

At follow-up period one, there were 57 women who reported the action stage of both heart healthy eating behavior and regular physical activity behavior. We explored whether these women maintained both behaviors (Figure 3). Over 70% of participants who reported the action stage for healthy eating and physical activity maintained both behaviors over the 11-19 month follow-up period.

Figure 3.

Participants who Reported both Heart Healthy Eating and Regular Activity at Follow-up Study One (n=57)



Qualitative Analysis: Maintaining a Heart Healthy Diet

Qualitative themes that emerged from the analysis of personal and environmental issues that influenced maintenance of healthy eating are listed in Table 2. Facilitators, barriers and physical environmental issues are discussed separately.

Facilitators of maintenance of a heart healthy diet

Seven qualitative themes emerged as facilitators of maintenance of healthy eating behavior. These themes were: (a) educational knowledge and awareness, (b) the All Women Count program, (c) family support, (d) personal health conditions, (e) family health issues, (f) cooking healthy foods, and (g) feeling better. Participants cited a variety of ways that their knowledge and awareness of healthy eating was improved. Attending nutrition classes with a family member experiencing a chronic disease and participation in the AWC counseling were frequently cited as sources that helped participants improve their understanding of healthy eating. Supportive family members, both spouses and children, were cited as helpful in the effort to eat healthy. Personal health conditions such as type 2 diabetes, elevated cholesterol and hypertension were

motivators of adherence to healthy eating. Participants were also motivated to improve their eating habits when chronic disease affected the health of a close family member.

Table 2. Influences on Maintenance of Healthy Eating

Personal and Environmental Issues	Qualitative Themes
Facilitators	Educational knowledge and awareness
	All Women Count! Program
	Family support
	Personal health conditions
	Family health Issues
	Cooking healthy foods
	Feeling better
Barriers	Cost of healthy foods
	Personal preference for less healthy foods
	Time
	Eating out
	Cooking for others
Physical Environment Issues	Availability of garden produce
	Rural access to healthy choices

Eating healthy foods that were cooked at home was a very beneficial way to improve eating behavior. Women indicated that change in the way they prepared foods and made food choices helped them to succeed at eating healthy. Participants also cited that they felt better physical health, including more energy and a more positive outlook. These quality of life benefits encouraged them to maintain healthy eating habits.

Barriers to maintaining a heart healthy diet

Data from responses to the open-ended question about issues that make eating a healthy diet a challenge were used to identify barriers to maintaining a heart healthy diet. The qualitative content analysis technique resulted in five themes that represented the most commonly named barriers to healthy eating. These themes were: (a) cost of

healthy foods, (b) personal preference for less healthy foods, (c) time, (d) eating out, and (e) cooking for others (Table 2).

The women in this study reported that fresh produce and lean meats were often more costly than less healthy foods, making healthy choices difficult on a limited budgeted. Participants also indicated that they preferred the taste of sweets and other unhealthy foods, especially as snacks. This preference for unhealthy foods made healthy choices difficult. Time to cook healthy foods was a barrier to eating healthy. Convenience foods are less healthy but are easier to prepare. Women were challenged to make healthy choices when eating away from home. Sometimes eating healthy in the home is difficult. Unhealthy food preferences of family members, especially the spouse or grandchildren, make eating healthy difficult. Participants cited that they disliked having to cook differently for other people.

Physical environmental influences on maintenance of healthy eating

Data from responses to the open-ended question about whether there are readily available healthy foods and eating options were used to identify issues within the physical environment that influence maintenance of eating healthy foods. Qualitative content analysis resulted in two physical environmental themes. These themes were: (a) garden produce, and (b) rural access to healthy choices (Table 2).

Participants indicated that eating fresh produce grown in a personal or family garden was an important way to maintain healthy eating. There were some women who indicated that their community had healthy options in restaurants and grocery stores, yet there were some women who reported that these options were not available to them. We sorted these responses by rural and non-rural dwellers using their zip code at the time of enrollment. Zip codes for communities with a population greater than 5,000 were considered non-rural. Rural zip codes were communities with a population less than 5,000 people using the 200 US Census data posted on the University of South Dakota (USD) School of Business web-site (USD, 2005). This sorting technique provided

added depth to the information. All participants who reported that their restaurants and grocery stores provided few healthy options were residents of rural areas.

Qualitative Analysis: Maintaining Regular Physical Activity

Qualitative themes that emerged from the analysis of personal and environmental issues that influenced maintenance regular physical activity are listed in Table 3. Facilitators, barriers and physical environmental issues are discussed separately.

Table 3.

Influences on Maintenance of Regular Physical Activity

Personal and Environmental Issues	Qualitative Themes
Facilitators	Support from others
	Enjoyable activities
	Occupational activities
	Knowledge of physical activity benefits
Barriers of Physical Activity	Personal health issues
	Time
	Weather
	Motivation
Physical Environment Factors	Convenient access to places for activity
	Cost of exercise facilities

Facilitators of maintenance of regular physical activity

Data from responses to the open-ended question about what helped most in the effort to maintain regular physical activity were used to identify facilitators of behavioral maintenance. The qualitative content analysis technique resulted in four themes that represented the most commonly named facilitators of regular physical activity. These themes were: (a) support from others, (b) enjoyable activity, (c) occupational activity, and (d) knowledge of the benefits of physical activity (Table 3).

Finding a walking partner or a family member or friend to encourage activity was the most commonly cited facilitator of behavioral maintenance. Women indicated that

the activities they selected were enjoyable. This strategy, finding enjoyment in chosen activities, was a positive affective state that transcended many types of physical activity. Women who worked at physically active occupations also indicated that they chose to enjoy their work more, knowing that the activity had a heart healthy benefit. This knowledge that physical activity would improve not only health, but also quality of life prompted women to adhere to their activity goals.

Barriers to maintenance of regular physical activity

Data from responses to the open-ended question about issues that make participation in regular activity a challenge were used to identify barriers to behavioral maintenance. The qualitative content analysis technique resulted in four themes, which were: (a) health issues, (b) time, (c) weather, and (d) motivation (Table 3).

Women cited both acute and chronic bone and joint problems as barriers to staying physically active. Injury, progressive arthritis, back pain and other diseases interfered with adherence to physical activity. Presence of any of these conditions was discouraging; yet some women reported that they found ways to overcome these interruptions in their daily routine. Finding time for activity was cited as problematic, especially for women who worked at sedentary occupations. Cold weather, hot weather, rain and wind were also issues that limited outdoor activities. Women cited that they sometimes lacked motivation for activity despite knowing the healthy benefits of moving more.

Physical environmental influences on maintenance of regular physical activity

Data from responses to the open-ended question about whether there are readily available places to be physically activity were used to identify issues within the physical environment that influence maintenance of regular physical activity. Qualitative content analysis resulted in two physical environmental themes. These themes were: (a) access to places for activity, and (b) cost of exercise facilities (Table 3).

Women cited bike paths, rural roads, city streets, outdoor and indoor school facilities (tracks and gymnasiums) and personal treadmills as important environmental resources for maintenance of activity. When wellness programs and structured exercise facilities were available to participants, cost was cited as prohibitive.

Advice to Women about Maintenance of Healthy Eating and Physical Activity

Data from responses to the open-ended question about advice to other women that may help them maintain improvements in healthy eating and physical activity were used to identify tips for how to maintain these two health behaviors. Qualitative content analysis resulted in five themes (Table 4). Participants advised women to find opportunities to fit more activity into their day. Suggestions included taking the stairs more and walking more often. Encouraging women to adhere to a plan was evident with the advice to "stick to it". Participants experienced benefits from maintaining healthy living that resulted from their ability to adhere to realistic goals. Women were encouraged to be very aware of what they eat and to choose wisely. Finally, these participants advised other women to adhere to healthy living because it would improve their life.

Table 4.
Advice on Maintenance of Healthy Eating and Activity

Maintenance Advice
Move more
Stick to a plan
Make conscious food choices
Do it to improve your life

Perceived Value of the All Women Count! WISEWOMAN Program

A single item numeric response scale was used to query participants about the perceived value of the WISEWOMAN component of the SD All Women Count! Program.

Participants were asked to rate the value of the WISEWOMAN interventions and program using a scale of 1 through 5, with one meaning no value and 5 meaning highest value. The mean response to this item was 4.12 $\pm$ 1.39, indicating a very high perceived program value. Participant comments about the program were requested. These comments reflected favorable perceptions of the program materials and interventionists. Participants agreed that the program is extremely helpful for women who lack insurance. Without the program, women commented that they would not have accessed the screenings. The materials and counseling were cited as very informational and helpful.

Limitations

Methodological issues in single group evaluation research limit the interpretation of findings. Without randomization and use of a true comparison or control group, it is difficult to discern the extent to which maintenance of health behavior can be attributed to the intervention. Sensitivity to actual changes in study outcomes is also limited by the types of questions used to solicit these data in the survey. Behavioral data were derived from a limited number of self-report items. Self-report of behavior has measurement limitations, especially failure to recall and social desirability. Use of biophysical indicators of physical activity or healthy eating would enhance the validity of findings for increased physical activity and improvements in diet quality.

There was a 49% return response to the mailed request for participation in the telephone interview and 55% of these respondents agreed to complete the survey. Findings cannot be generalized to the women who did not respond to the request or who declined survey participation.

Discussion & Recommendations

WISEWOMAN is a promising approach to improving the cardiovascular health of low-income uninsured women. Results from 3 pilot studies showed favorable outcomes.

Demonstration projects in 12 states, including this project in SD are now examining whether WISEWOMAN can be integrated with existing NBCCPDP programs. The results of this study indicate that SD WISEWOMAN participants can maintain improvements in healthy eating and physical activity behavior for 11-19 months post baseline measurement. Jacobs and colleagues (2004) reported on maintenance of behavior change among North Carolina WISEWOMAN participants who received computer tailored messages through follow-up phone calls during the year after WISEWOMAN counseling. This enhanced intervention facilitated progression in stage of physical activity behavior change more than the control group that received no follow-up. We observed maintenance of health behavior without an enhanced intervention in this study. Staten and colleagues (2004) reported on the 12 month behavior changes among mainly Hispanic women after a randomized test of three different WISEWOMAN interventions. The three strategies included (a) counseling only, (b) counseling and health education, or (c) counseling, healthy education and support from community health workers. Participants in each group increased their physical activity from baseline from 12 months. Women assigned to the most intensive intervention experienced improvements in fruit and vegetable consumption while the other two interventions groups did not. This intensive intervention for Hispanic women showed that better results were seen with the more enhanced intervention. Further study is needed to determine whether enhanced follow-up leads to even better changes in eating and activity as observed in this study of SD participants.

Recommendations for cardiovascular health promotion for women were made by the Women's Cardiovascular Health Network members who represent 10 Prevention Research Centers (Krummel et al., 2001). This group recommended that public health programs target broad environmental influences on health. Physical environments that are conducive to healthy eating and physical activity are important. Rural Midwestern communities are challenged to provide access to healthy foods in grocery stores and

restaurants. These same communities need to offer protected environments where women can walk safely in extreme weather conditions. Partnerships with local government and community organizations (e.g., grocery stores, restaurants, schools, malls, community centers, and park and recreation departments) are needed for successful integration of healthy eating and physical activity into the daily lives of community members. Promotion of personal and community gardening is a creative strategy that not only improves physical activity but healthy eating for SD women.

Nearly two-thirds of SD WISEWOMAN participants are working. These women need opportunities for activity as part of the work day if their occupation is not physically active. Worksite partnerships, even encouragement of walking during break times, can help these women to overcome one of the classic barriers to physical activity, i.e., time.

Further study is needed to examine the effectiveness and cost-effectiveness of the WISEWOMAN program (Finkelstein et al., 2004). We did not measure the resource requirements that facilitated improvements in health behavior for WISEWOMAN participants. This type of evaluation is needed to better demonstrate the cost-benefit of public health programs targeting chronic disease risk reduction.

Sharing the wisdom of these study participants with future WISWOMAN enrollees is an important intervention strategy. Lewis and Colleagues (2004) report that WISEWOMAN success stories are essential to promote women's health. The strategies used by women in this study can be shared in order to gain support for community participation in health promotion efforts, inform other people about how women maintain improvements in health behavior and encourage interventionists in their work.

Conclusions

Low-income women in SD can achieve and maintain healthy eating and physical activity behavior change after the provider-counseled program offered by the SD WISEWOMAN program. While there is limited evidence demonstrating the effectiveness

of all WISEWOMAN programs (Farris, Haney, & Dunet, 2004), this study contributes to our knowledge that the WISEWOMAN approach to improving cardiovascular health for low-income women is promising.

References

American Heart Association (2004). *Prevalence and risk profile for heart and cardiovascular disease.* Retrieved April 15, 2005 from the World-wide-web: http://www.americanheart.org

Blair, S. N., Dunn, A. L., Marcus, B. H., Carpenter, R.A., Jaret, P. (2001). *Active Living Every Day.* Champaign, IL: Human Kinetics.

Centers for Disease Control and Prevention (2003). *WISEWOMAN: Improving the Health of Uninsured Women*. Atlanta: Author.

Fahrenwald, N. F. (2004a). *Process evaluation of South Dakota WISEWOMAN: A cardiovascular disease risk reduction program for low-income women*. Brookings, SD: South Dakota State University.

Fahrenwald, N. F. (2004b). *Interventionist evaluation of South Dakota WISEWOMAN: A cardiovascular disease risk reduction program for low-income women*. Brookings, SD: South Dakota State University.

Farris, R. P., Haney, D. M., & Dunet, D. O. (2004). Expanding the evidence for health promotion: Developing best practices for WISEWOMAN. *Journal of Women's Health, 13*(5), 634-643.

Finkelstein, E. A., Khavjou, O. A., Mobley, L. R., Haney, D. M., & Will, J. C. (2004). Racial/ethnic disparities in coronary heart disease risk factors among WISEWOMAN. *Journal of Women's Health, 13*(5), 503-518.

Institute of Medicine, Committee on Health and Behavior: Research, Practice, and Policy (2001). *Health and behavior: The interplay of biological, behavioral, and societal influences.* Washington, DC: National Academy Press.

Jaccard, J. & Becker, M. A. (1997). *Statistics for the behavioral sciences*, (3rd ed.). Pacific Grove, CA: Brooks/Cole.

Jacobs, A. D., Ammerman, A. S., Ennett, S. T., Campbell, M. K., Tawney, K. W., Aytur, S. A., Marshall, S. W., Will, J. C., & Rosamond, W. D. (2004). Effects of a tailored follow-up intervention on health behaviors, beliefs, and attitudes. *Journal of Women's Health, 13*(5), 557-568.

Keyserling, T., Ammerman, A., Atwood, J., Hosking, J., Krasny, J., Zayed, H., & Worthy, B. (1999). A cholesterol intervention program for public health nurses in the rural southeast: description of the intervention, study design, and baseline results. *Public Health Nursing, 16*, 156-67.

Lewis, S. D., Johnson, V. R., Farris, R. P., & Will, J. C. (2004). Using success stories to share knowledge and lessons learned in health promotion. *Journal of Women's Health), 13*(5), 616-624.

National Cancer Institute, Office of Cancer Communication. (1989). *Making health communication programs work: a planner's guide.* (NIH Publication No. 89-1493) Bethesda, MD: National Institutes of Health.

North Carolina WISEWOMAN (2000). *WISEWOMAN Program Materials and Resources*. Chapel Hill, NC: Prevention Research Centers.

Prochaska, J.O., DiClemente, C.C., & Norcross, J.C. (1992). In search of how people change. *American Psychologist, 47,* 1102-1114.

Rosamond, W. D., Ammerman, A. S., Holliday, J. L., Tawney, K. W., Hunt, K. J., Keyserling, T. C., Will, J.C., & Mokdad, A.H. (2000). Cardiovascular disease risk factor intervention in low-income women: the North Carolina WISEWOMAN project. *Preventive Medicine, 31*(4), 370-379.

South Dakota Department of Game, Fish & Parks (2002). *South Dakota State Park Trail Atlas*. Pierre, SD: Author.

South Dakota Department of Health (2001). *A New Leaf for South Dakota: Midwest Style Recipes*. Pierre, SD: Author.

South Dakota Department of Health (2003). *2001 South Dakota Vital Statistics Report: A State and County Comparison of Leading Health Indicators*. Pierre, SD: Author.

Staten, L. K., Gregory-Mercado, K. Y., Ranger-Moore, J., Will, J. C., Giuliano, A. R., Ford, E. S., & Marshall, J. (2004). Provider counseling, health education, and community health workers: The Arizona WISEWOMAN project. *Journal of Women's Health), 13*(5), 547-556.

University of North Carolina (2001). *A New Leaf for Healthy Living*. Chapel Hill, NC: University of North Carolina, Center for Health Promotion and disease Prevention.

United States Department of Health and Human Services (1996). *Physical activity and health: a report of the Surgeon General.* Pittsburg: US Government Printing Office, Superintendent of Documents.

University of South Dakota, School of Business (2005). *United States Census* 2000. Retrieved April 15, 2005 from the World-wide-web: http://www.usd.edu/brbinfo/sdc/census.htm

Wen, L. M., Thomas, M., Jones, H., Orr, N., Moreton, R., King, L., Hawe, P., Bindon, J., Humphries, J., Schicht, K., Corne, S., & Bauman, A. (2002). Promoting physical activity in women: evaluation of a 2-year community-based intervention in Sydney, Australia. *Health Promotion International, 17*(2), 127-137.

Will, J. C., Massoudi, B., Mokdad, A., Ford, E. S., Rosamond, W., Stoddard, A. M., Palombo, R., Holliday, J., Byers, T., Ammerman, A., Troped, P., & Sorensen, G. (2001). Reducing risk for cardiovascular disease in uninsured women: combined results from two WISEWOMAN projects. *Journal of the American Medical Women's Association, 56*(4), 161-165.

WISEWOMAN Workgroup (1999). Cardiovascular Disease Prevention for Women Attending Breast and Cervical Cancer Screening Programs: The WISEWOMAN Projects. *Preventive Medicine, 28*(5), 496-502.

Appendix A. Letter of Invitation

All Women Count!

South Dakota Project

Winter, 2005

Dear All Women Count participant:

Thank you for returning our past survey. ***You were one of many women who made great changes in your eating or activity after the All Women Count interventions.*** *We want to know what helped you to maintain these changes.* If we know what helped you to make changes in eating or activity, we may be better able to help other women.

You are asked to be a part of this All Women Count research study. We would like to call you on the telephone and ask you about how you maintain healthy eating or physical activity Your time is important so we will keep the phone call as brief as possible. The call will take 15 minutes of your time. Your participation in this project is voluntary.

There are no known risks linked to this study. The interview asks for your thoughts about how you improved eating and exercise habits. Results from this study will help the SD Department of Health to improve the WISEWOMAN program.

Your responses are confidential. The findings from the study may be published in scientific journals or presented at scientific meetings, but your identity will be kept strictly secret. You can choose to be a part of this study, or you can choose not to be a part of this study. If you choose not to be a part of the study you will not lose any All Women Count program benefits or services.

Please assist us in our research. ***Return the enclosed postcard to us. Mark the postcard box next to YES if you will participate in the interview. Then, indicate a day of the week and a phone number where we can reach you best. If you do not want to be part of the interview, mark the box next to NO and return the card to us.*** You consent is implied by returning the postcard and checking the yes box***. Please keep this letter for your information.*** You have the right to not be a part of this study or to withdraw at any time. Your rights as a research participant have been explained to you. If you have any additional questions concerning your rights, you may contact the South Dakota State University Institutional Review Board (IRB) chairperson, Debra Spear, telephone 605-688-6578, email: Debra_Spear@sdstate.edu.

If you have any questions, you may contact me at the number below. Thank you for your time.

Sincerely,

Nancy Fahrenwald, PhD, RN
Project Director: All Women Count Evaluation
South Dakota State University, College of Nursing, Box 2275
Brookings, SD 570007

Appendix B. Response to Invitation Postcard

Back side of post card that is included in the mailing of the participant letter.

ID # _____

N. Fahrenwald, PhD, RN
All Women Count!
College of Nursing, Box 2275
South Dakota State University
Brookings, SD 57007

Front side of postcard that is included in the mailing of the participant letter and returned by the participant.

Check Yes or No. If YES, add phone number, day and time.

___**YES**, I am willing to be a part of the phone interview.

The *best phone number* to reach me is : **(_____) -_____-_____**

The best *day(s)* and *time(s)* to reach me are: (Circle all that apply)

Mon Tues Wed The Fri Sat or any day

CHECK one or more: Morning __ Afternoon __ Evening __ Anytime ____

___**NO**, I do not wish to be part of the phone interview.

Appendix C. Maintenance Interview Tool

All Women Count Maintenance Study, 2005

Participant Name_____ Participant ID_____
Phone Number: _____ Date of contact & attempt # ___1 ___2 ___3 ___4 ___5

Introduction
Hello, is this _____ (name of participant); This is _____ (name of interviewer); I am calling from South Dakota State University on behalf of the All Women Count program in South Dakota. You returned our card and said that this is a good time and day to contact you. Thank you for returning the card. We want to ask you some questions about how you are doing with healthy eating and activity. Is this still a good time to talk for about 15-20 minutes? YES or NO (If yes, go to next line. If no: When is a good time to call back: _____)

Questions
You returned one of our past surveys and told us that you were doing quite well with healthy eating, activity or both. We want to ask a few questions to find out how you are doing today. I am going to start by asking about how you are doing with healthy eating.

A heart healthy diet is one that includes only small amounts of fat from meat, dairy products, spreads or sauces, and includes plenty of fruits, vegetables and grain products (like rice, bread, cereal, and noodles).

1. In general, how heart healthy is your diet now?

○ Not very heart healthy	○ A little heart healthy	○ Pretty much heart healthy	○ Very heart healthy	○ Don't know

2. So would you say that you are currently eating a heart healthy diet?

○ **No, go to 4**	○ **Yes, go to 3**

3. About how long have you been eating a heart healthy diet?

○ less than 6 months – go to 5	○ 6 months or longer – go to 5	○ Don't know – go to 5

4. Which of these statements describes you best?
   - □ I am not thinking about starting to eat a more heart healthy diet. (Go to #6)
   - □ I am really thinking of starting to eat a more heart healthy diet in the next 6 months. (Go to #6)
   - □ I have plans to start eating a heart healthy diet in the next month. (Go to #6)
   - □ Don't know. (Go to #6)

5. Which of these statements describes you best?
   - □ I am happy with the types of food I eat now and am planning to stick with what I am doing.
   - □ I am really thinking of starting to eat more heart healthy foods in the next 6 months.
   - □ I have plans to start eating even more heart healthy foods in the next month.
   - □ Don't know.

6. Moderate physical activity includes doing things that get you moving. Some examples of moderate activities are pushing a vacuum cleaner, sweeping, raking, and walking at a brisk pace. Are you now doing activities that really get you moving for a total of 30 minutes or more on most days?

○ **No, go to 8**	○ **Yes, go to 7**

7. About how long have you been doing activities that really get you moving for a total of 30 minutes or more on most days?

○ less than 6 months- go to 9	○ 6 months or longer – go to 9	○ Don't know – go to 9

8. Which of these statements describes you best?
   - □ I am not thinking about getting more physical activity. (Go to 10)
   - □ I am really thinking of getting more physical activity in the next 6 months. (Go to 10)
   - □ I have plans to get more physical activity in the next month. (Go to 10)
   - □ Don't know. (Go to 10)

9. Which of these statements describes you best?
   - □ I am happy with the amount of activity I do now and am planning to stick to what I'm doing.
   - □ I am really thinking of starting to be even more active in the next 6 months.
   - □ I have plans to being even more active in the next month.
   - □ Don't know.

10. What has helped you most in your effort to eat a healthier diet?

11. What is one of the biggest issues that makes healthy eating a challenge for you?

12. What about the place where you live. Are there healthy eating options available to you easily? Give us some examples.

13. What has helped you most in your effort to be more physically active?

14. What is one of the biggest issues that makes getting more physical activity a challenge for you?

15. What about the place where you live. Are there places where you can be active, that you can use or get to easily? Give us some examples.

16. If you could offer some advice to other women who are trying to eat healthy or to fit more activity into their day, what would that advice be?

17. I have one last question. On a scale of 1 to 5, with 1 meaning no value and 5 meaning the highest value, how would you rate the benefit you received from the All Women Count program?

_____ I received no counseling (X) 1 2 3 4 5
No value Highest value

Comments:

Thank you for your participation in this survey. We really appreciate your time and input. Good bye.